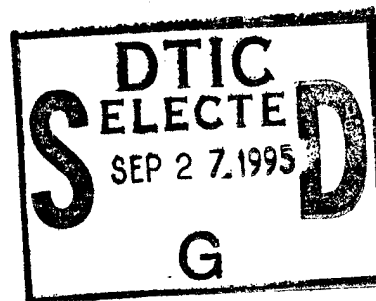


**DEVELOPMENT OF AN ULTRA-SAFE RECHARGEABLE  
LITHIUM-ION BATTERY**



Contract # N00014-94-C-0141  
ARPA Order # 9332004arp01/13 APR 1994/313ES

**R & D Status Report #3**

**Reporting Period: 16 December 1994 - 15 January 1995**

**19950925 081**

Submitted by:

**The Electrofuel Manufacturing Company Inc.**

**DISTRIBUTION STATEMENT A**

Approved for public release;  
Distribution Unlimited

# DEVELOPMENT OF AN ULTRA-SAFE RECHARGEABLE LITHIUM-ION BATTERY

## R&D STATUS REPORT 1931-1003/0

ARPA Order No.: 9332004arp01/13APR1994/313ES  
Program Code No.: ARPA-BAA93-32  
Contractor: The Electrofuel Manufacturing Company Inc.  
Contract No.: N00014-94-C-0141 Contract Amount: \$1271728.  
Effective Date of Contract: August 15, 1994  
Expiration Date of Contract: February 14, 1996  
Principal Investigator: J.K. Jacobs  
Telephone No.: (800) 388-2865  
Short Title of Work: Lithium-ion Battery Development  
Reporting Period: December 16, 1994 to January 15, 1995

### Description of Progress:

Fabrication of batteries using the prototype and pilot lines will require substantially larger quantities of active cathode materials (lithium manganese oxides and alternate lithiated transition-metal oxides). Thus, a suitable furnace for the high temperature reaction had been planned, and designed. Construction of this equipment is now complete. The furnace has been commissioned and is currently undergoing testing with 1, 2, and 5 kg batch sizes.

The design of the prototype web handling equipment is now complete and fabrication has started. It will be in the form of a three-section modular unit with an unwind/coating module, a hot-air drying tunnel, and a multipurpose (laminating, slitting, rewind, strip-stack, etc.) module. All are of cantilever design except the laminator, and are designed to handle webs from 1 to 8 inches wide.

Studies leading to a stack-pressure control methodology have been successfully completed. This includes separator design and verification and current collector adhesion verification. The separator is a gel-impregnated microporous polymer with good mechanical strength and penetration resistance.

Construction of the baseline button cells is well underway with a group of 20 cells scheduled to be completed in early February.

Forming cycles and a characterization cycle will be performed immediately thereafter.

Construction of the first hand-crafted cells is starting, slightly ahead of schedule. These will be made on the lab bench in single-sheet form for verification of assembly method. Although it is not expected that these cells will have representative performance characteristics (due to inevitable variations and imperfections in the hand-crafting process) cell cycling will be attempted as material becomes available.

Change in Key Personnel: None

Summary of Substantive Information Derived from Special Events:  
None:

Problems Encountered and/or Anticipated: None

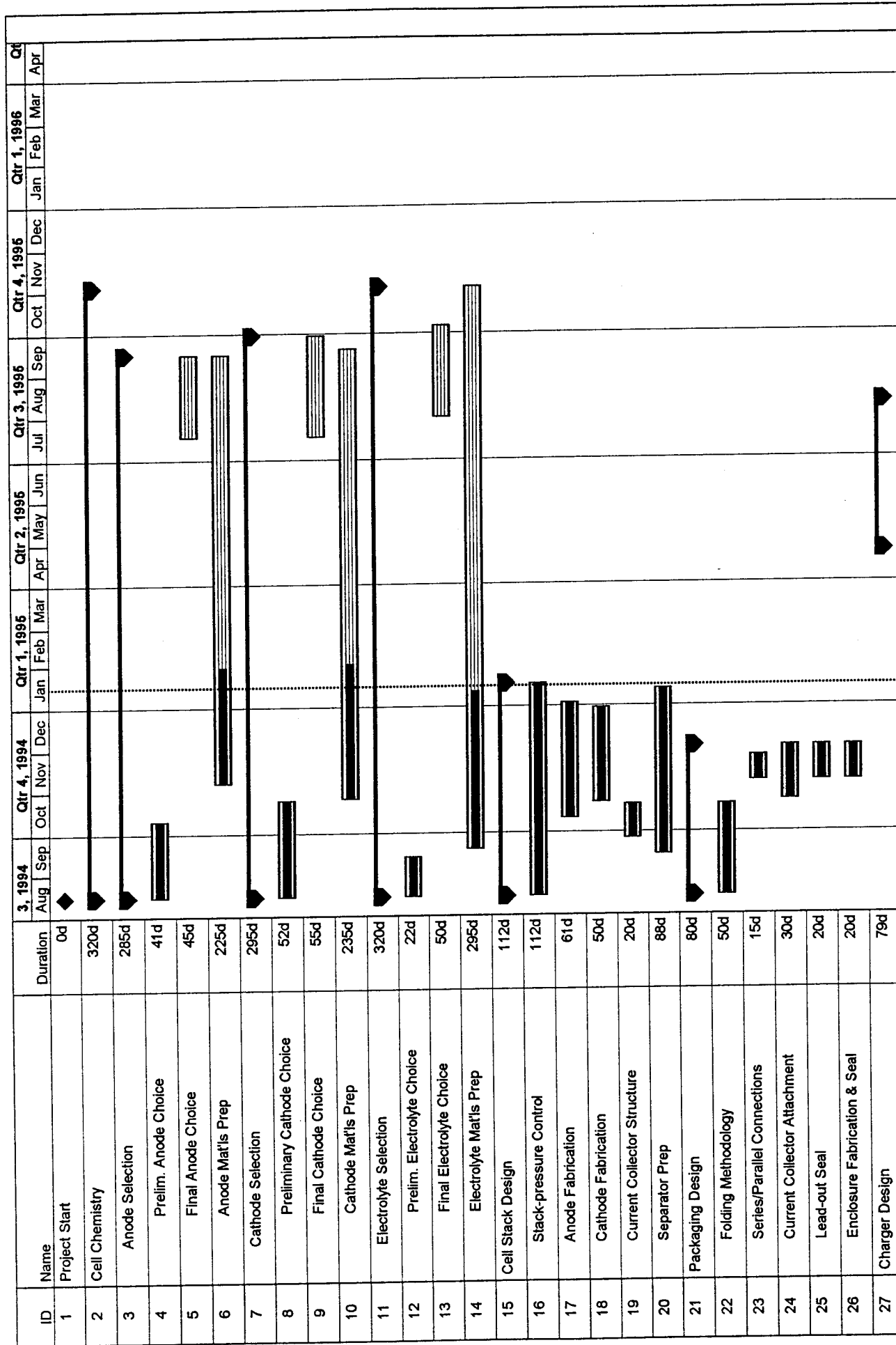
Action Required by the Government: None






Fiscal Status:

Total Estimate of Program	US Govt Funding Obligation	Electro fuel Contribution
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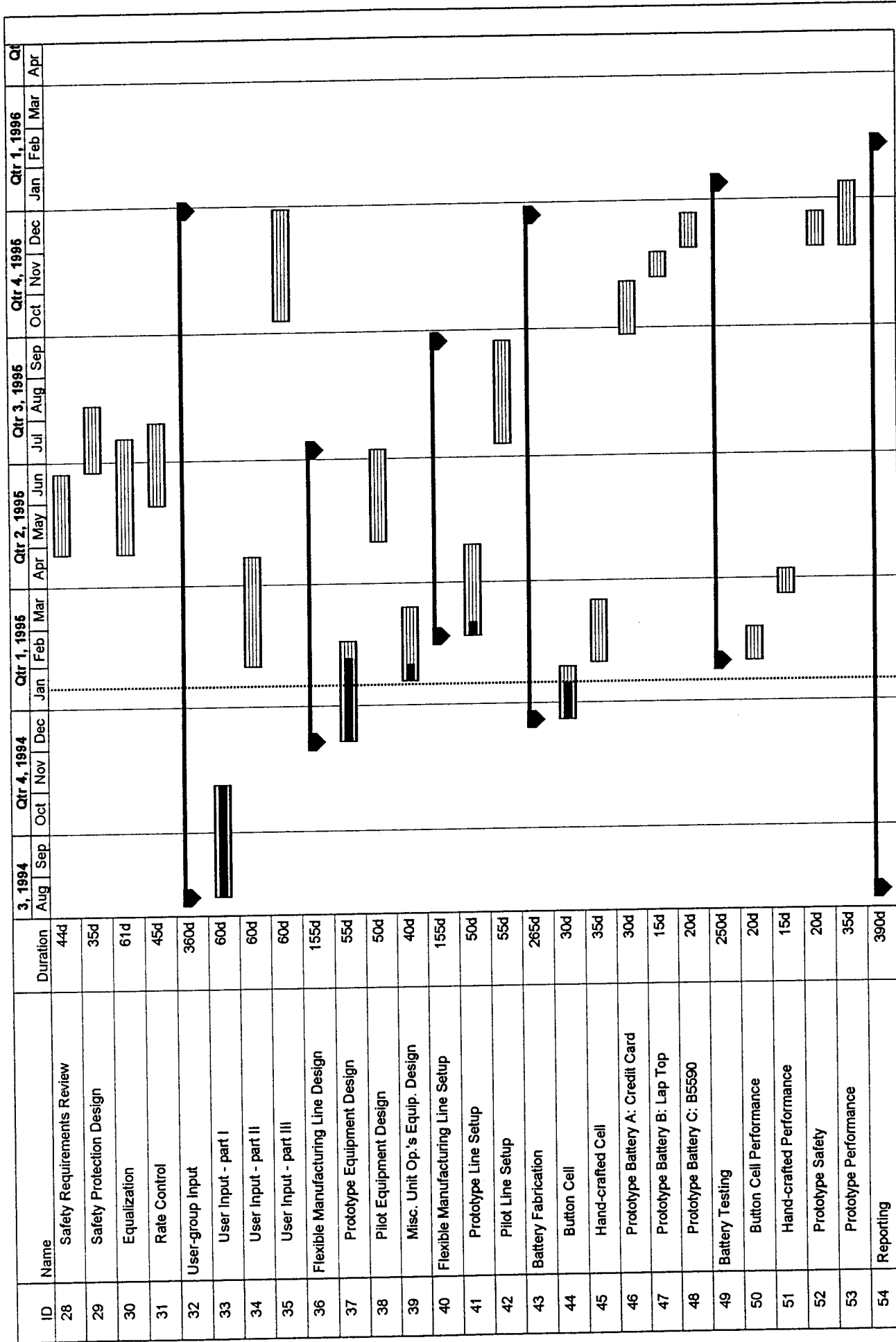
(1) Amt. currently provided on contract:	\$1630421	\$1271728	\$358693
(2) Expenses & commitments to date:	\$ 239916	\$ 187134	\$ 52782
(3) Funds required to complete work:	\$1390505	\$1084594	\$305911

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Unannounced <input type="checkbox"/>	
Justification _____	
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Distribution /	
Availability Codes	
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 Progress  
 Critical  
 Noncritical  
 Summary  
 Rolled Up

Project: Li-Ion Battery  
 Date: 1/26/95



Project: Li-ion Battery  
 Date: 1/26/95

